

Amendments to the Claims:

Claims 16, 28, 29, and 30 are proposed to be amended herein. Please note that all claims currently pending and under consideration in the referenced application are shown below. Please enter these claims as amended. This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claims 1-15 (Canceled)

16. (Currently amended) A process for producing alkyl esters useful in biofuels and lubricants, the process comprising:

providing an organic composition comprising at least one component selected from the group consisting of:

acylglycerols;

~~_____ fats;~~

~~_____ oils;~~

~~_____ waxes in combination with at least one component selected from the group consisting of acylglycerols, fats, and oils; and~~

~~_____ free fatty acids in combination with at least one component selected from the group consisting of acylglycerols, fats, and oils of acylglycerols, fats, and oils;~~

providing a critical fluid medium including at least one fluid selected from the group consisting of carbon dioxide, sulfur dioxide, methane, ethane, propane, and mixtures thereof;

dissolving the organic composition and either a C₁-C₄ short chain alcohol or water into the critical fluid medium;

reacting the organic composition with the short chain alcohol or water in the presence of a catalyst in a single phase to produce a final product comprising an alkyl ester and glycerol, wherein the glycerol leaves the single phase as it is formed;

separating the glycerol from the alkyl ester; and
separating the alkyl ester from the critical fluid medium,

wherein the particular critical fluid medium is selected so that, when combined with the organic composition, the critical fluid medium provides decreased loss of catalyst or catalytic activity and elimination of mass transfer limitations by maintaining the various reactants in a single phase.

17. (Previously presented) The process of claim 16, wherein dissolving the organic composition and either a C₁-C₄ short chain alcohol or water into the critical fluid medium comprises dissolving the organic composition and the short chain alcohol selected from the group consisting of ethanol, methanol, propanol, butanol, isopropanol and isobutanol into the critical fluid medium.

18. (Previously presented) The process of claim 16, wherein reacting the organic composition with the short chain alcohol or water in the presence of a catalyst comprises reacting the organic composition in the presence of a liquid phase catalyst.

19. (Previously presented) The process of claim 18, wherein reacting the organic composition in the presence of a liquid phase catalyst comprises reacting the organic composition in the presence of the liquid phase catalyst selected from the group consisting of HCl, H₂SO₄, HNO₃, NaOH, and KOH.

20. (Previously presented) The process of claim 16, wherein reacting the organic composition with the short chain alcohol or water in the presence of a catalyst comprises reacting the organic composition in the presence of a solid phase catalyst.

21. (Previously presented) The process of claim 20, wherein reacting the organic composition in the presence of a solid phase catalyst comprises reacting the organic composition in the presence of a microporous crystalline solid.

22. (Previously presented) The process of claim 20, wherein reacting the organic composition in the presence of a solid phase catalyst comprises reacting the organic composition in the presence of an exchange resin with either acidic or basic properties.

23. (Previously presented) The process of claim 20, wherein reacting the organic composition in the presence of a solid phase catalyst comprises reacting the organic composition in the presence of an inorganic oxide selected from the group consisting of alumina, silica, silica-alumina, boria, oxides of phosphorus, titanium dioxide, zirconium dioxide, chromia, zinc oxide, magnesia, ion exchange resins, silicate catalysts, and calcium oxide either unmodified or modified with chlorine, fluorine, sulfur or an acid or base.

Claim 24 (Canceled)

25. (Previously presented) The process of claim 16, further comprising recycling the critical fluid medium for use in a later reaction.

Claim 26 (Canceled)

27. (Previously presented) The process of claim 16, wherein providing a critical fluid medium comprises providing the critical fluid medium optionally including a critical fluid co-solvent selected from the group consisting of methanol, ethanol, butanol, and water.

28. (Currently amended) A process for producing alkyl esters useful in biofuels and lubricants, the process comprising:

providing an organic composition comprising at least one component selected from the group consisting of:

—acylglycerols;

—fats;

~~oils;~~
~~waxes in combination with at least one component selected from the group consisting of acylglycerols, fats, and oils; and~~
~~free fatty acids in combination with at least one component selected from the group consisting of acylglycerols, fats, and oils; and~~
providing a critical fluid medium including at least one fluid selected from the group consisting of carbon dioxide, sulfur dioxide, methane, ethane, propane, and mixtures thereof, and optionally including at least one critical fluid co-solvent selected from the group consisting of methanol, ethanol, butanol, and water;
dissolving the organic composition and either a C₁-C₄ short chain alcohol or water into the critical fluid medium;
reacting the organic composition with the short chain alcohol or water in the presence of a catalyst in a single phase to produce a final product comprising an alkyl ester and glycerol, wherein the glycerol leaves the single phase as it is formed;
separating the glycerol from the final product by modifying the temperature and pressure of the final product; and
separating the alkyl ester product from the critical fluid medium by modifying the temperature and pressure of the critical fluid medium.

29. (Currently amended) A process for producing alkyl esters useful in biofuels and lubricants, the process comprising:

providing an organic composition comprising at least one component selected from the group consisting of:
~~acylglycerols;~~
~~fats;~~
~~oils;~~
~~waxes in combination with at least one component selected from the group consisting of acylglycerols, fats, and oils; and~~

~~— free fatty acids in combination with at least one component selected from the group consisting of acylglycerols, fats, and oils of acylglycerols, fats, and oils;~~
providing a critical fluid medium including at least one fluid selected from the group consisting of carbon dioxide, sulfur dioxide, methane, ethane, propane, and mixtures thereof;

dissolving the organic composition and either a C₁-C₄ short chain alcohol or water into the critical fluid medium; and

reacting the organic composition with the short chain alcohol or water in the presence of a catalyst at a temperature from about 20°C to about 200°C and a pressure from about 150 psig to about 4000 psig, wherein the reaction occurs in a single phase to produce a final product comprising an alkyl ester and glycerol and wherein the glycerol leaves the single phase as the glycerol is formed;

wherein the critical fluid medium is selected such that a reaction temperature is within about 20% of a critical temperature of the critical fluid medium and a reaction pressure is within about 0.5 to about 15 times a critical pressure of the critical fluid medium as modified by a co-solvent.

30. (Currently amended) A process for producing alkyl esters useful in biofuels and lubricants, the process comprising:

providing an organic composition comprising at least one component selected from the group consisting of:

~~— acylglycerols;~~

~~— fats;~~

~~— oils;~~

~~— waxes in combination with at least one component selected from the group consisting of acylglycerols, fats, and oils, and~~

~~— free fatty acids in combination with at least one component selected from the group consisting of acylglycerols, fats, and oils of acylglycerols, fats, and oils;~~

dissolving the organic composition and a C₁-C₄ short chain alcohol or water into a critical fluid medium, wherein the critical fluid medium is at least one fluid selected from the group consisting of carbon dioxide, sulfur dioxide, methane, ethane, and propane, and mixtures thereof, the critical fluid medium solubilizing the organic composition and the C₁-C₄ short chain alcohol or water into a single phase;

reacting the organic composition with the C₁-C₄ short chain alcohol or water in the presence of a catalyst in the single phase to produce a final product stream comprising an alkyl ester and glycerol;

separating the glycerol from the final product stream by modifying a temperature and pressure of the critical fluid medium; and

separating the alkyl ester from the critical fluid medium by modifying the temperature and pressure of the critical fluid medium.